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KEVIN L. RUSSELL CHERNOFF, VILHAUER, MCCLUNG & STENZEL LLP 1600 ODS TOWER 601 SW SECOND AVENUE PORTLAND, OR 97204			EXAMINER THOMPSON, JAMES A	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 09/823,372  
Filing Date: March 30, 2001  
Appellant(s): DOLAN ET AL.

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**JUL 19 2007**

**Technology Center 2600**

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Kurt Rohlf  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 17 April 2007 appealing from the Office action mailed 30 August 2006.

Art Unit: 2625

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

5,198,853	ICHIHARA ET AL.	3-1993
6,046,828	FENG ET AL.	4-2000
5,696,595	YAMANISHI	12-1997
5,778,104	KOWALSKI	7-1998

Art Unit: 2625

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

**Claims 2-3, 12, 14-15, 17-18, 20-21, 24-25, 28, 34 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichihara (US Patent 5,198,853) in view of Feng (US Patent 6,046,828).**

**Regarding claim 40:** Ichihara discloses an imaging system (figures 1-4 and column 4, lines 45-55 of Ichihara) comprising:

- an image sensor (figure 1(4) and column 5, lines 58-63 of Ichihara).
- a backing (figure 2(2) of Ichihara) having a surface opposed to said sensor (as clearly shown in figure 2 and column 5, lines 49-53 of Ichihara).
- an image processor (figure 4(35) and column 7, lines 44-48 of Ichihara) having a plurality of stat buffers (figure 4 (23a,28,30,33,34); and column 7, lines 6-9 and lines 44-48 of Ichihara) and that analyzes candidate edges for bounding regions (figure 3B and column 6, lines 56-61 of Ichihara) and identifies shadows cast by an object adjacent said backing as edges of a bounding region (column 6, lines 56-61 and column 17, lines 56-61 of Ichihara) based, at least in part, on:
  - a variable luminance threshold value (column 7, lines 48-51 and column 9, lines 11-18 of Ichihara) compared with one or more statistical measures (figure 6-A; figure 6-B; and column 7, lines 58-64 of Ichihara) and that causes detection of shadows cast by said object on said backing (column 6, lines 56-61 and column 7, lines 64-68 of Ichihara); and
  - the presence of detected said shadow in a contiguous plurality of stat buffers (figure 7(F-6 to F-12); figure 8(P-5 to P-8); and column 9, lines 48-62 of Ichihara).

Ichihara does not disclose expressly that said variable luminance threshold is automatically calculated using said one or more statistical measures.

Art Unit: 2625

Feng discloses automatically calculating a variable luminance threshold using one or more statistical measures (figures 3-6; column 5, lines 19-28; and column 6, lines 48-57 of Feng).

Ichihara and Feng are combinable because they are from the same field of endeavor, namely the detection of document edges in a document image scanning system. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the one or more statistical measures taught by Ichihara to automatically calculate the variable luminance threshold, as taught by Feng. The suggestion for doing so would have been that the measurements for determining the edges of a scanned document are statistical in nature (column 7, lines 58-64 of Ichihara; and column 5, lines 19-18 of Feng). A further suggestion for doing so would have been that the determination of boundary edges is based on the relative values of the threshold and the statistical calculations derived from edge candidate pixels (figure 7(F-6,F-10); figure 8(P-5); and column 9, lines 11-18 of Ichihara). Therefore, it would have been obvious to combine Feng with Ichihara to obtain the invention as specified in claim 40.

**Regarding claim 2:** Ichihara discloses that the scanned object is essentially flat (figure 2(G) and column 6, lines 33-40 of Ichihara). The document to be scanned (figure 2(G) and column 6, lines 33-40 of Ichihara) is clearly flat.

**Regarding claim 3:** Ichihara discloses that said backing is a cover (column 5, lines 49-53 of Ichihara) and is substantially flat (as can clearly be seen in figure 2 of Ichihara) and is in a face-to-face relationship with said object (figure 2 and column 6, lines 37-40 of Ichihara).

**Regarding claim 12:** Ichihara discloses that said imaging system increases the difference (variation ratio) of luminance values in the range of likely document edge values (column 8, lines 58-68 of Ichihara).

**Regarding claim 14:** Ichihara discloses that an image obtained from sensing said object has a plurality of horizontal rows of pixels vertically aligned with respect to each other (figure 5 and column 8, lines 19-23 of Ichihara), and said imaging system groups said horizontal rows of pixels into a plurality of

Art Unit: 2625

vertically contiguous groups (column 8, lines 62-67 of Ichihara), and said imaging system computes a statistical measure in a direction transverse to said horizontal row of pixels (column 8, line 67 to column 9, line 5 of Ichihara), using said statistical measure when detecting said boundary region (figure 6-A; figure 7; and column 7, lines 58-68 of Ichihara).

**Regarding claim 15:** Ichihara discloses that an image obtained from sensing said object has a plurality of vertical columns of pixels horizontally aligned with respect to each other (figure 5 and column 8, lines 24-28 of Ichihara), and said imaging system groups said vertical columns of pixels into a plurality of horizontally contiguous groups (column 9, lines 41-49 of Ichihara), and said imaging system computes a statistical measure in a direction transverse to said vertical column of pixels (column 9, lines 46-54 of Ichihara), using said statistical measure when detecting said boundary region (figure 6-B; figure 8; and column 9, lines 53-62 of Ichihara).

**Regarding claims 17 and 18:** Ichihara discloses that said imaging system detects edges using said statistical measure (column 7, lines 64-68 and column 8, lines 10-14 of Ichihara).

**Regarding claim 20:** Ichihara discloses that a set of statistical measures in a direction transverse to said horizontal row of pixels from a plurality of said groups are statistic-ally processed for detecting said boundary region (figure 6-A and column 7, lines 59-68 of Ichihara).

**Regarding claim 21:** Ichihara discloses that a set of statistical measure in a direction transverse to said vertical column of pixels from a plurality of said groups are statistic-ally processed for detected a said boundary region (figure 6-B and column 8, lines 1-14 of Ichihara).

**Further regarding claim 24:** Feng discloses that said threshold value varies with the size of the object being images (column 6, lines 52-56 of Feng).

**Regarding claim 25:** Ichihara discloses that said imaging system determines said at least one boundary of said object based upon a variable (column 10, lines 63-68 of Ichihara) said threshold value (column 9, lines 11-18 and lines 48-53 of Ichihara).

Art Unit: 2625

Ichihara does not disclose expressly that said threshold value is calculated using said statistical measures.

Feng discloses calculating a variable luminance threshold using statistical measures (figure 3-6; column 5, lines 19-28; and column 6, lines 48-57 of Feng).

Ichihara and Feng are combinable because they are from the same field of endeavor, namely the detection of document edges in a document image scanning system. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the statistical measures taught by Ichihara to set the variable luminance threshold, as taught by Feng. The suggestion for doing so would have been that the measurements for determining the edges of a scanned document are statistical in nature (column 7, lines 58-64 of Ichihara; and column 5, lines 19-18 of Feng). A further suggestion for doing so would have been that the determination of boundary edges is based on the relative values of the threshold and the statistical calculations derived from edge candidate pixels (figure 7(F-6,F-10); figure 8(P-5); and column 9, lines 11-18 of Ichihara). Therefore, it would have been obvious to combine Feng with Ichihara to obtain the invention as specified in claim 25.

**Regarding claim 28:** Ichihara discloses that an image obtained from sensing said object has a plurality of horizontal rows of pixels (figure 5 and column 8, lines 19-23 of Ichihara).

**Regarding claim 34:** Ichihara discloses that an image obtained from sensing said object has a plurality of vertical columns of pixels (figure 5 and column 8, lines 24-28 of Ichihara).

**Claims 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichihara (US Patent 5,198,853) in view of Feng (US Patent 6,046,828) and Yamanishi (US Patent 5,696,595).**

**Regarding claim 4:** Ichihara discloses that the edges of a document are determined based on the shadows cast on the cover (figure 2(2) and column 17, lines 56-61 of Ichihara) and that soil and toner, which would cause inconsistencies in the coloration of the cover, worsens the detectability of document edges (column 10, lines 44-50 of Ichihara). Thus, it would be reasonable to infer that said cover has a background color that covers a major portion of said cover. However, Ichihara in view of Feng does not expressly disclose said cover has a background color that covers a major portion of said cover.

Yamanishi discloses a background color (white) that covers a major portion of a scanner cover (column 10, lines 53-55 of Yamanishi). Since the scanner cover is white (column 10, lines 53-55 of Yamanishi), then clearly the background color (white) covers a major portion of said scanner cover.

Ichihara in view of Feng is combinable with Yamanishi because they are from the same field of endeavor, namely scanning and processing digital image and document data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to specifically use a cover which has a background color that covers a major portion of said cover, as taught by Yamanishi. The suggestion for doing so would have been that inconsistencies in the coloration of the cover worsens the detectability of document edges (column 10, lines 44-50 of Ichihara). Thus, one of ordinary skill in the art at the time of the invention would naturally use a background color for the cover that covers a major portion of said cover. Therefore, it would have been obvious to combine Yamanishi with Ichihara in view of Feng to obtain the invention as specified in claim 4.

**Regarding claim 5:** Ichihara discloses that said imaging system is capable of determining a plurality of boundaries of said object (figure 5; column 7, lines 64-68; and column 8, lines 7-14 of Ichihara).



Art Unit: 2625

**Regarding claim 6:** Ichihara discloses that said imaging system is capable of determining four boundaries of said object (figure 5; column 7, lines 64-68; and column 8, lines 7-14 of Ichihara).

**Regarding claim 7:** Ichihara discloses that said imaging system has a flat surface supporting said object (figure 2(1) and column 5, lines 49-51 of Ichihara).

**Regarding claim 8:** Ichihara discloses that said object is paper (figure 2(G); figure 3-B(A3,A4,B5); and column 5, lines 49-51 of Ichihara). The object (figure 2(G) of Ichihara) that is scanned is a document (column 5, lines 49-51 of Ichihara). Furthermore, the scanner is clearly set for scanning standard paper sizes (figure 3-B(A3,A4,B5) of Ichihara). Therefore, said object is clearly paper.

**Claims 9-11, 13, 22-23 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichihara (US Patent 5,198,853) in view of Feng (US Patent 6,046,828) and Kowalski (US Patent 5,778,104).**

**Regarding claims 9 and 13:** Ichihara in view of Feng does not disclose expressly that said imaging system converts a first color space of an image obtained from sensing said object to a second color space where the luminance of said image is enhanced over the first color space.

Kowalski discloses converting a first color space of an image obtained from sensing said object (column 3, lines 53-59 of Kowalski) to a second color space (column 3, lines 66-67 of Kowalski), where the luminance of said image is enhanced over the first color space (column 4, lines 2-11 of Kowalski). Computing the luminance values by using different coefficients, and therefore different proportions, of the color components (column 4, lines 2-11 of Kowalski) enhances the luminance values of the first color space.

Ichihara in view of Feng is combinable with Kowalski because they are from the same field of endeavor, namely digital image data scanning and processing. At the time of the invention, it would have

Art Unit: 2625

been obvious to a person of ordinary skill in the art to convert a color document into enhanced luminance values, as taught by Kowalski, in order to detect the boundaries using the imaging system taught by Ichihara. The suggestion for doing so would have been that the imaging system of Ichihara operates based on the difference in luminance values of the image, which are used to detect the shadows (column 8, lines 58-68 of Ichihara). Therefore, if a color image is to be processed, the color component values need to be converted into luminance values for processing. Therefore, it would have been obvious to combine Kowalski with Ichihara in view of Feng to obtain the invention as specified in claims 9 and 13.

**Further regarding claim 10:** Kowalski discloses that said first color space includes a plurality of dimensions (column 3, lines 46-51 of Kowalski) and said second color space includes fewer dimensions than said first color space (column 4, lines 4-11 of Kowalski). There are three color components, such as RGB, in said first color space (column 3, lines 46-51 of Kowalski) and only one color component (luminance) in said second color space (column 4, lines 4-11 of Kowalski).

**Further regarding claim 11:** Kowalski discloses that said first color space is red, green and blue (column 3, lines 51-52 of Kowalski), and said second color space is luminance (column 4, lines 4-11 of Kowalski).

**Regarding claims 22 and 23:** Ichihara in view of Feng does not disclose expressly that the statistical processing said statistical measures emphasizes spatial regions of increased statistical measure.

Kowalski discloses further processing spatial regions of increased statistical measure to emphasize said regions (column 4, lines 37-39 and lines 56-61 of Kowalski). Filter values are determined for a neighborhood of pixels (column 4, lines 37-39 of Kowalski) based on the statistical measure of said neighbor-hood (column 4, lines 56-61 of Kowalski).

Ichihara in view of Feng is combinable with Kowalski because they are from the same field of endeavor, namely digital image data scanning and processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to filter the image data based on the variation between

Art Unit: 2625

the minimum and maximum luminance values of a group, as taught by Kowalski. Therefore, in the system taught by Ichihara in view of Feng, the variation of the luminance values would determine how much emphasis a group would receive, depending on whether or not there is an edge. The motivation for doing so would have been to improve the quality of an image which comprise a combination of features (column 3, lines 2-7 of Kowalski). Therefore, it would have been obvious to combine Kowalski with Ichihara in view of Feng to obtain the invention as specified in claims 22 and 23.

**Regarding claims 26 and 27:** Ichihara in view of Feng does not disclose expressly that said variable threshold value is calculated based upon a percentage of the maximum observed statistical measure.

Kowalski discloses calculating the variable filter values of the neighborhood of pixels based upon a percentage of the maximum observed statistical measure (column 4, lines 56-61 of Kowalski). The percentage difference between the maximum and minimum luminance values of the neighborhood of pixels determines the filter value since  $L_{min}$  changes linearly from  $1/9$  to  $1$  as said difference increases (column 4, lines 56-61 of Kowalski). In other words, as percentage difference between  $L_{min}$  and  $L_{max}$  increases, the variable filter values increase.

Ichihara in view of Feng is combinable with Kowalski because they are from the same field of endeavor, namely digital image data scanning and processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to set the variable threshold taught by Ichihara in view of Feng based on the percentage of the statistical measures, as taught by Kowalski. The motivation for doing so would have been to improve the quality of an image which comprise a combination of features (column 3, lines 2-7 of Kowalski), and would therefore require a variable threshold. Therefore, it would have been obvious to combine Kowalski with Ichihara in view of Feng to obtain the invention as specified in claims 26 and 27.

**(10) Response to Argument****Regarding page 5, line 2 to page 7, line 17 of Appeal Brief:**

As set forth in the previous office action, mailed 30 August 2006, Ichihara teaches all the limitations of claim 40 *except* for each and every aspect of the limitation regarding the variable luminance threshold value. As set forth on page 5 of the previous office action, Ichihara teaches a variable luminance threshold value compared with one or more statistical measures and that causes detection of shadows cast by the object on the backing of the imaging system. In Ichihara, the variable luminance threshold is varied *manually* by the operator [see column 7, lines 48-51 of Ichihara]. Ichihara does not teach that the variable luminance threshold is *automatically* calculated using said one or more statistical measures.

As also set forth on page 5 of the previous office action, Feng teaches *automatically* calculating a variable luminance threshold using one or more statistical measures. In considering whether Feng is applicable to Ishihara, one must consider how both Ishihara and Feng operate. Firstly, in the previous office action, Examiner applied more than the single cite mentioned by Appellant to demonstrate that Feng teaches automatically calculating a variable luminance threshold using one or more statistical measures. The cite provided by Appellant [column 6, lines 48-57 of Feng] is a secondary aspect of document boundary detection in Feng. Particularly, Feng teaches that the black/white point detection *via* the histogram shown in figure 9 of Feng is used in the detection of the background of the document and the calculation of the variable luminance threshold value [see column 6, lines 52-57 of Feng], which is in stark contrast to the arguments by Appellant [see last two lines of page 6 to page 7, line 8 of Appeal Brief]. The histogram shown in figure 9 of Feng is used to detect if the document extends beyond the boundaries of the backing, which would mean that the backing is undetectable.

More importantly, Feng uses statistically significant deviations in scanned image density to detect the position of the boundary between the document edge and the backing [see figures 3-6 and column 5, lines 19-28 of Feng, as cited in the previous office action]. While the statistical variation in Feng is only somewhat larger than the level of noise, this is due to the fact that the background color of the document and the color of the backing are similar with respect to each other. However, applied to the system of Ichihara, the variation due to the difference between the document, shadow, and backing would result in a much greater contrast, and would thus be more readily detectable than the slight difference in color between the document background and the backing, as taught in Feng. The document background and the backing are both similar shades of white or off-white. Shadow, on the other hand, is similar to black and thus much more easily detected using the statistical measures taught by Feng.

Actually, if what Appellant alleges were true and the standard deviation of the luminance values recorded by respective sensor pixels imaging the backing and a shadow on the backing would only reflect sensor noise, then the manual setting of the threshold value as taught by Ichihara would be wholly impossible. If the deviation in luminance values between the backing and the shadow are so similar as to be in the range of the image noise, an operator would be unable to tell when a manual adjustment of the variable luminance threshold value has any appreciable effect. In fact, a detection and mitigation of the effects of shadow would be meaningless and untenable.

Finally, in support of the *prima facie* case of obviousness, Examiner has set forth two different suggestions by which one of ordinary skill in the art at the time of the invention would have come to combine the cited teachings of Feng with Ichihara. Firstly, the measurements for determining the edges of a scanned document are statistical in nature [see both column 7, lines 58-64 of Ichihara; and column 5, lines 19-18 of Feng]. This similarity of teaching not only suggests the possibility of combining Ichihara and Feng, but shows a nexus of teaching between the two references. Secondly, the determination of boundary edges is based on the relative values of the threshold and the statistical calculations derived

Art Unit: 2625

from edge candidate pixels (figure 7(F-6,F-10); figure 8(P-5); and column 9, lines 11-18 of Ichihara).

Thus, applying the detection of statistically significant deviations in luminance values according to position, as taught by Feng, is readily applicable to the system of Ichihara.

**Regarding page 7, lines 18-23 of Appeal Brief:**

The threshold calculated in column 6, lines 52-56 of Feng is used in the case that the scanned document covers the ends of the scanner, and thus possibly extends beyond the boundary of the scanner. This threshold value for determining the boundary of the document (specifically that there is no boundary within the confines of what can be scanned by the scanner) is clearly different from the threshold that is calculated if there is a detectable boundary, since the threshold for detecting a boundary is based on different statistical results.

**Regarding page 8, line 20 to page 9, line 12 of Appeal Brief:**

Appellant's arguments in page 8, line 20 to page 9, line 12 of the Appeal Brief are based entirely on the assumption that the rejection of claim 40 is inadequate. Since claim 40 has been shown above to be rendered obvious by the combination of Ishihara in view of Feng, claims 4-8, 9-11, 13, 22, 23, 26 and 27 cannot therefore be deemed allowable merely due to their respective dependencies.

**Regarding page 9, lines 14-16 of Appeal Brief:**

Since all of the claims have been demonstrated to be rendered obvious over the prior art, Examiner respectfully requests that the Board affirm Examiner in his rejections.

Art Unit: 2625

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

James A. Thompson



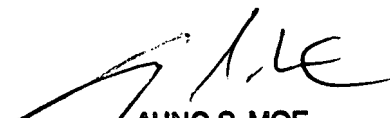
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